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TITLE: SPACER FOR CERVICAL VERTEBRA EXPANSION

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ABSTRACT:

PROBLEM TO BE SOLVED: To provide a spacer for cervical vertebra expansion, wherein the space is easily and quickly fixed between cervical vertebrae, and the expansion of the cut cervical vertebrae more than a necessary spacing is prevented while surely maintaining its fixing for a long time.

SOLUTION: The particular place of a cervical vertebra 1 is cut, a spacer 2 is provided between the cut portions, a pair of fixing members 7 and 8 for fixing the spacer between the cut portions of the cervical vertebra are provided in the spacer 2 while one side thereof is stacked on another, a locking portion to be locked in a locking hole 2D formed in the cervical vertebra 1 is provided in one end part of the sides separated from each other in the direction of inter-cervical vertebra portions of the fixing members 7 and 8, and a movement preventing portion is provided in the other end for preventing the movement of the fixing members 7 and 8 in the directions of being separated from each other.

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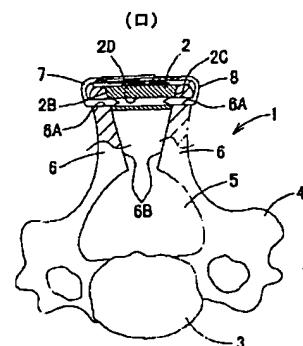
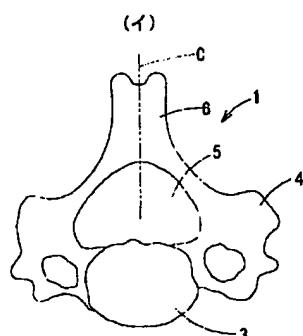
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(54)【発明の名称】 頸椎拡大用スペーサ

(57)【要約】 (修正有)

【課題】 スペーサを頸椎間に容易迅速に固定することができ、しかも、その固定を長期間に渡って確実に維持させることができるようにしながら、切断された頸椎を必要間隔以上に拡大することを回避することができる頸椎拡大用スペーサを提供する点にある。

【解決手段】 頸椎1の特定箇所を切断し、この切断した頸椎間にスペーサ2を介在し、このスペーサ2を頸椎間に固定するための一対の固定部材7, 8を、それらの一側同士が重なり合う状態で該スペーサ2に備えさせ、前記各固定部材7, 8の部位のうちの前記頸椎間方向で互いに離れる側の一端部に、前記頸椎1に形成した係止孔2Dに係止する係止部13, 17を備えさせ、かつ、他端部に互いに離間する方向への該固定部材7, 8の移動を阻止するための移動阻止部22を備えさせたことを特徴とする。



## 【特許請求の範囲】

【請求項1】 頸椎の特定箇所を切断して分割された頸椎間に介在するためのスペーサ本体と、このスペーサ本体を頸椎間に固定するための一対の固定部材とからなり、前記一対の固定部材を、それらの一側同士が重なり合う状態で該スペーサ本体に備えさせるとともに、前記各固定部材の部位のうちの前記頸椎間方向で互いに離れる側の一端部に、前記頸椎に形成した被係止部に係止する係止部を備えさせ、かつ、他端部に互いに離間する方向への該固定部材の移動を阻止するための移動阻止部を備えさせたことを特徴とする頸椎拡大用スペーサ。

【請求項2】 前記各固定部材を、上側部と、この上側部の下方に位置する下側部と、これら上側部の一端とこれと同一側の下側部の一端とを連結する縦部とからなる側面視においてほぼコの字状部材から構成し、前記上側部の遊端部に前記移動阻止部を備えさせ、かつ、前記下側部の遊端部に前記係止部を備えさせ、これら一対の固定部材を各固定部材の上側部及び下側部の遊端部同士が互いに向かい合う姿勢で、かつ、一対の固定部材の上側部同士が重なり合った状態で前記スペーサ本体に備えさせたことを特徴とする請求項1記載の頸椎拡大用スペーサ。

【請求項3】 前記被係止部が前記頸椎に形成した底部を有する溝んだ凹部からなり、この凹部に前記係止部を突き刺すことにより該凹部に係止部を係止することを特徴とする請求項1記載の頸椎拡大用スペーサ。

【請求項4】 前記被係止部が前記頸椎に形成した貫通孔からなり、この貫通孔に前記係止部を貫通させることにより該貫通孔に係止部を係止することを特徴とする請求項1記載の頸椎拡大用スペーサ。

【請求項5】 前記貫通孔から貫通突出した前記係止部の先端が係止可能な貫通孔又は凹部を前記スペーサ本体に形成してなる請求項1又は4記載の頸椎拡大用スペーサ。

【請求項6】 前記一方の固定部材の上側部を、前記スペーサ本体に頸椎間方向に沿って形成された貫通孔又は溝内に入り込み可能で、かつ、入り込んだ遊端部側が開放された一対の部材からなる二股状の挟持部から構成し、前記他方の固定部材の上側部を、前記スペーサ本体に頸椎間方向に沿って形成された貫通孔又は溝内に入り込み可能で、かつ、前記挟持部の一端の開放側端部から一対の部材間に入り込み可能な挿入片から構成し、前記挟持部を構成する一方の部材の内面に形成された歯部と、この歯部に前記離間する方向への固定部材のスライド移動で噛み合わせるために前記挿入片に備えさせた複数の歯を有するほぼノコギリ歯形状の歯部とから前記移動阻止部を構成してなる請求項1又は2記載の頸椎拡大用スペーサ。

【請求項7】 前記切断箇所を頸椎の椎弓の特定箇所とし、この切断した椎弓の角部が係止可能な溝部を前記ス

ペーサ本体の側壁に形成してなる請求項1記載の頸椎拡大用スペーサ。

【請求項8】 前記切断箇所を頸椎の棘突起をほぼ2分割する位置とし、これらほぼ2分割された棘突起間にスペーサ本体を設けてなる請求項1記載の頸椎拡大用スペーサ。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、頸椎の特定箇所を切断し、その切断された頸椎間にスペーサ本体を設けることによって、頸椎を拡大して、脊髄が圧迫されて起こる各種障害を取り除くための頸椎拡大用スペーサに関する。

## 【0002】

【従来の技術】従来、例えば図14(イ)に示すように、頸椎1の椎弓4の特定箇所を切断し、この切断した椎弓4、4間に上下方向一対の貫通孔30A、30Bが形成されたスペーサ本体2を介在した状態にし、この介在されたスペーサ本体2を糸31を用いて椎弓4、4間に固定できるようしている。つまり、糸31を切断された一方の椎弓4の端部の内部にそれに形成した孔32を通して上方から挿入した後、横側壁33から外部に通す。次に、スペーサ本体2の一方の貫通孔30Aに下方から上方へ挿通した後、他方の貫通孔30Bに上方から下方へ挿通し、この後、切断された他方の椎弓4の端部の横側壁から挿入した後、上方から外部に孔34を介して通し、その先端部と糸31の基端部とを締結して、スペーサ本体2を椎弓4、4間に固定するのである。

## 【0003】上記固定方法では、糸31を多数の孔3

1、30A、30B、34に挿通させなければならないため、その作業に多くの時間を要するものであり、患者に大きな負担を与えるものであった。又、糸31を大きな張力を加えた状態で強固に締結することができないだけでなく、時間経過に伴い糸31が弛んでしまうことがあり、スペーサ本体2を椎弓4、4間に確実に固定することができないことがあった。又、糸31をスペーサ本体2と椎弓4との間に容易に挿通させるためには、図14(イ)に示すようにスペーサ本体2と椎弓4との間にある程度の間隔を開けておかなければならない。このため、切断された椎弓4、4同士をスペーサ本体2を介在するための必要最小限の間隔を開けなければならず、必要以上に椎弓を拡大操作することから、椎弓4を傷つけてしまう恐れもあった。

## 【0004】

【発明が解決しようとする課題】本発明が前述の状況に鑑み、解決しようとするところは、スペーサ本体を頸椎間に容易迅速に固定することができ、しかも、その固定を長期間に渡って確実に維持させることができるようにしながら、切断された頸椎を必要間隔以上に拡大することを回避することができる頸椎拡大用スペーサを提供す

る点にある。

【0005】

【課題を解決するための手段】本発明は、前述の課題解決のために、頸椎の特定箇所を切断して分割された頸椎間に介在するためのスペーサ本体と、このスペーサ本体を頸椎間に固定するための一対の固定部材とからなり、前記一対の固定部材を、それらの一側同士が重なり合う状態で該スペーサ本体に備えさせるとともに、前記各固定部材の部位のうちの前記頸椎間方向で互いに離れる側の一端部に、前記頸椎に形成した被係止部に係止する係止部を備えさせ、かつ、他端部に互いに離間する方向への該固定部材の移動を阻止するための移動阻止部を備えさせたことを特徴としている。従って、頸椎の特定箇所を切断し、この切断した頸椎間にスペーサ本体を介在させた後、又は介在させると同時に、一対の固定部材の頸椎間方向で互いに離れる側の一端部それぞれの備えさせた係止部を、頸椎に形成した被係止部に係止させる。この状態から、互いに離間する方向へ一対の固定部材が移動しようとすると、他端部に備えさせた移動阻止部により一対の固定部材の移動が阻止され、スペーサが頸椎間に固定されるのである。

【0006】前記各固定部材を、上側部と、この上側部の下方に位置する下側部と、これら上側部の一端とこれと同一側の下側部の一端とを連結する縦部とからなる側面視においてほぼコの字状部材から構成し、前記上側部の遊端部に前記移動阻止部を備えさせ、かつ、前記下側部の遊端部に前記係止部を備えさせ、これら一対の固定部材を各固定部材の上側部及び下側部の遊端部同士が互いに向かい合う姿勢で、かつ、一対の固定部材の上側部同士が重なり合った状態で前記スペーサ本体に備えさせている。

【0007】前記被係止部が前記頸椎に形成した底部を有する満んだ凹部からなり、この凹部に前記係止部を突き刺すことにより該凹部に係止部を係止させて、スペーサ本体の上方への移動を阻止することができる。しかも、被係止部を凹部にすることによって、被係止部の形が貫通孔よりも凹部の方が容易に行うことができる。

【0008】前記被係止部が前記頸椎に形成した貫通孔からなり、この貫通孔に前記係止部を貫通させることにより該貫通孔に係止部を係止させて、スペーサ本体の上方への移動を阻止することができる。しかも、被係止部を貫通孔にすることによって、前記凹部に突き刺す場合に比べて係止部と被係止部とが係止している領域を容易に増大させることができとなる。

【0009】前記貫通孔から貫通出した前記係止部の先端が係止可能な貫通孔又は凹部を前記スペーサ本体に形成することによって、係止部が係止している領域を更に増大させることができる。

【0010】前記一方の固定部材の上側部を、前記スペーサ本体に頸椎間方向に沿って形成された貫通孔又は溝

内に入り込み可能で、かつ、入り込んだ遊端部側が開放された一対の部材からなる二股状の挟持部から構成し、前記他方の固定部材の上側部を、前記スペーサ本体に頸椎間方向に沿って形成された貫通孔又は溝内に入り込み可能で、かつ、前記挟持部の一端の開放側端部から一対の部材間に入り込み可能な挿入片から構成し、前記挟持部を構成する一方の部材の内面に形成された歯部と、この歯部に前記離間する方向への固定部材のスライド移動で噛み合わせるために前記挿入片に備えさせた複数の歯を有するほぼノコギリ歯形状の歯部とから前記移動阻止部を構成している。挿入片が挟持部の一対の部材間に入り込むことによって、挟持部にて挿入片が挟み込まれた状態となり、この状態で挟持部を構成する一方の部材の内面に形成された歯部が挿入片に備えさせた複数の歯のうちの特定の歯に噛み合うと、前記挟持部による挿入片の挟持を解除しない限り、前記噛み合いが解除されることがないのである。又、移動阻止部を、挟持部を構成する一方の部材に形成の歯部と、この歯部に噛み合わせるために挿入片に形成した複数の歯を備えたほぼノコギリ歯形状の歯部とすることによって、頸椎に形成した係止孔が所望位置からずれている場合でも、これを吸収して係止後の一対の固定部材の離間側への移動を確実に阻止することができる。

【0011】前記切断箇所を頸椎の椎弓の特定箇所とし、この切断した椎弓の角部が係止可能な溝部を前記スペーサ本体の側壁に形成することによって、椎弓の角部にスペーサ本体の側壁を係止させるだけで、椎弓間に介在させたスペーサ本体が位置変更することを阻止することができる。

【0012】前記切断箇所を頸椎の棘突起をほぼ2分割する位置とし、これらほぼ2分割された棘突起間にスペーサ本体を設けたものでもよい。

【0013】

【発明の実施の形態】図1(イ)に、7個ある頸椎1…のうちの1個の頸椎1を示し、この頸椎1の特定箇所、つまり棘突起6を2分割する、又はほぼ2分割する位置Cを切断し、図1(ロ)に示すように、この切断した棘突起6、6間にスペーサ本体2を介在して固定したものを示している。前記頸椎1は、切株状の椎体3とその後ろに弓なりについている椎弓4とからなる。前記椎体3と椎弓4の間に椎孔5と呼ばれる穴があり、ここに脊髄が通ることになる。前記椎弓4から後ろに向かって1本の棘突起6が出ている。

【0014】図1(ロ)では、前記棘突起6、6間に介在したスペーサ本体2にスライド移動自在に互いに上下方向で重なり合う状態で備えさせた一対の固定部材7、8によりスペーサ本体2を棘突起6、6間に固定できるようにしている。このようにほぼ半分に分割された薄い棘突起6、6を後述の水平部14、18によりスペーサ本体2に係止固定することができるから、棘突起6、6

50

に貫通孔6A, 6Aを形成することにより棘突起6, 6の保形強度が低下することを抑制することができると共に係止固定をより確実なものにすることができる。

【0015】前記スペーサ本体2は、生体親和性、機械的強度、耐蝕性等の生体内安定性を備えたアルミナ、ジルコニア、ハイドロキシアパタイト等のセラミック材料や、ステンレス鋼、チタン合金等の金属材料の表面に必要に応じてアルミナ、アパタイト、塗化チタン等のセラミックをコーティングした複合材料から構成してもよいし、又、天然骨を削って成形したものでもよい。図2及び図5(イ), (ロ), (ハ), (ニ)に示すように、前記スペーサ本体2の長手方向両側の上端部のそれぞれに、前記棘突起6の上面に接当して該スペーサ本体2をその姿勢に維持することができる延出部2Aを備えるとともに、スペーサ本体2の上面のうちの左右幅方向ほぼ中央位置に長手方向に沿う溝2Mを備えている。前記切断された棘突起6の端面6B, 6Bに対応するスペーサ本体2の横側面2B, 2Cを下方側ほど内方側に位置する傾斜面に形成するとともに、前記棘突起6の切断時に棘突起6の端面6A, 6Aを図1(ロ)に示すように棘突起6の先端側を削ったテーパー面になるように形成することによって、切断された棘突起6の端面6B, 6Bの全面をスペーサ本体2の横側面2B, 2Cに接当させることができ、棘突起6, 6間に介在されたスペーサ本体2の位置の安定性を高めることができるようになっている。尚、スペーサ本体2と棘突起6との大きさ関係は図示される関係以外でもよい。

【0016】前記一対の固定部材7, 8は、ステンレス鋼で構成しているが、チタン合金等の各種の金属材料や硬質合成樹脂等、どのような材料から構成してもよい。図2及び図3(イ)～(ホ)に示すように、前記一対の固定部材7, 8の一方7を、前記溝2M内に入り込み可能で、かつ、入り込んだ遊端部側が開放された上下一対の部材9, 10からなる二股状の挾持部(上側部)11と、前記スペーサ本体2の外部まで延出した前記挾持部11の他端から下方に湾曲状に延びる縦部12と、この縦部12の下端からスペーサ本体2側に延び、かつ、その延出端部にはほぼ円錐形状の係止部13を備えた前記挾持部11よりも短い寸法に構成された水平部(下側部)14とから構成している。前記係止部13は、前記切断された一方の棘突起6に形成された被係止部としての貫通孔6Aに貫通した後、スペーサ本体2に形成の貫通孔2Dに係止するものである。又、図2及び図4(イ)～(ホ)に示すように、他方8を前記スペーサ本体の溝2M内に入り込み可能で、かつ、入り込んだ遊端が前記挾持部11の開放側端部から上下の部材9, 10間に入り込み可能な挿入片(上側部)15と、この挿入片15の他端部から下方に延びる縦部16と、この縦部16の下端からスペーサ本体2側に延び、かつ、その延出端部にはほぼ円錐形状の係止部17を備えた前記挾持部11より

も短い寸法に構成された水平部(下側部)18とから構成している。前記係止部17は、前記他方の棘突起6に形成された貫通孔6Aに貫通した後、スペーサ本体2に形成の貫通孔2Dに係止するものである。前記係止部13, 17は、先端部ほど先細り形状となるほぼ円錐形状に形成することにより、貫通孔2Dへの貫通を容易に行うことができる利点があるが、ほぼ円柱状のものや、三角柱や四角柱等の多角柱状のものでもよい。

【0017】そして、前記上側の部材9の遊端部下面に形成の歯部19と、この歯部19に前記固定部材7, 8のスライド移動方向で互いに離間する方向への移動で噛み合わせるために前記挿入片15の上面に所定間隔置きに形成した複数の歯20…を備えたほぼノコギリ歯形状の歯部21とから、前記一対の固定部材7, 8のスライド移動方向で互いに離間する側への移動を阻止するための移動阻止部22を構成している。

【0018】従って、図6(イ)に示すように、まず、切断された棘突起6, 6に、それらの間に介在した状態のスペーサ本体2の貫通孔2Dと連通状態となるように

貫通孔2Dとほぼ同一の直径を有する貫通孔6A, 6Aを形成する。この後、棘突起6, 6を抜けた状態にして棘突起6, 6間の隙間に前記貫通孔2Dの中心と貫通孔6A, 6Aの中心とが合致した状態でスペーサ本体2を介在させる。次に、一対の固定部材7, 8を、棘突起6, 6の両側から固定部材7, 8の水平部14, 18が棘突起6, 6の貫通孔6A, 6Aに貫通し、かつ、挾持部11に挿入片15が入り込む状態でそれら11, 15が溝2M内に入り込むように、スライド移動させ、これら固定部材7, 8のスライド移動ができるまで、つまり

固定部材7, 8の縦部12, 16の内側が棘突起6, 6に接当するまで、固定部材7, 8をスライド移動させる(図6(ロ)参照)。尚、前記固定部材7, 8をスペーサ本体2に予め備えさせておき、固定部材7, 8を備えさせたスペーサ本体2を切断された棘突起6, 6間に介在させ、固定部材7, 8をスライド移動させるようにしてよい。この場合、スペーサ本体2を介在させる前に、固定部材7, 8をスペーサ本体2に対して最大離間位置に位置させておき、スペーサ本体2を介在させる過程で固定部材7, 8の水平部14, 18が棘突起6, 6に形成された貫通孔6A, 6Aに貫通させることができるようにスペーサ本体2に対する固定部材7, 8の位置を互いに接近する側に移動させる。このようにスペーサ本体2を介在させた後は、固定部材7, 8をさらに互いに接近する側に移動させることによって、前記水平部14, 18の係止部13, 17の先端をスペーサ本体2に形成の貫通孔2Dに係止することで、スペーサ本体2の上方への移動を阻止することができるようになっている。

そして、図6(ロ)に示すように、歯部19と特定の歯20が噛み合うことによって、固定部材7, 8がスライド移動方向で互いに離間する方向への移動が阻止され、

スペーサ本体2を棘突起6, 6間に固定できるのである。このとき、一対の部材9, 10が挿入片15を挟み込んで(挟持して)いるから、前記歯部19と特定の歯20との噛み合いが外れることを確実に阻止することができるようしている。

【0019】前記実施例では、頸椎1の切断箇所を棘突起6を2分割する、又はほぼ2分割する位置とし、その位置で切断された棘突起6, 6間にスペーサ本体2を介在させる場合を説明したが、図7(イ), (ロ)に示すように頸椎1の切断箇所Cを椎弓4の特定箇所とし、その切断した椎弓4, 4間にスペーサ本体2を介在させてもよい。つまり、図8(イ)に示すように、まず、切断された椎弓4, 4を拡げることにより椎弓4, 4間の隙間に一対の固定部材7, 8を備えたスペーサ本体2を介在させる。この場合、スペーサ本体2を介在させる前に、固定部材7, 8をスペーサ本体2に対して最大離間位置に位置させておき、スペーサ本体2を介在させる過程で固定部材7, 8の水平部14, 18が係止孔4B, 4Bに入り込むことができるようスペーサ本体2に対する固定部材7, 8の位置を互いに接近する側に移動させることになる。このようにスペーサ本体2を介在させた後は、固定部材7, 8を互いに接近する側に移動させることによって、前記水平部14, 18の円錐形状の係止部13, 17の先端を係止孔4B, 4Bの壁面4b, 4bに突き刺すことで(図8(ロ)参照)、スペーサ本体2の上方への移動を阻止することができるようしている。このとき、図8(ロ)に示すように、歯部19と特定の歯20が噛み合うことによって、固定部材7, 8がスライド移動方向で互いに離間する方向への移動が阻止され、スペーサ本体2を椎弓4, 4間に固定することができる。この場合も前記同様に、一対の部材9, 10が挿入片15を挟み込んで(挟持して)いるから、前記歯部19と特定の歯20との噛み合いが外れることを確実に阻止することができるようしている。前記係止部13, 17の形状は、先端部ほど先細り形状で、かつ、先端が尖っている円錐形状のものが係止孔4B, 4Bの壁面4b, 4bに容易に突き刺すことができるものであるが、係止孔4B, 4Bの壁面4b, 4bに突き刺すことができるものであれば、円錐形状のものに限定されるものではない。

【0020】前記固定部材7, 8の係止構造を、図9(イ), (ロ)に示すように構成してもよい。つまり、係止孔4B, 4Bに横方向から貫通する貫通孔4Cを形成し、この貫通孔4Cに先端がほぼ円錐形状の係止部13, 17の先端を係止させて固定するようにしてもよいし、又、図10(イ), (ロ)に示すように、水平部14, 18を長く形成すると共に、スペーサ本体2に係止部13, 17の先端を係止する貫通孔2Dを形成して、前記貫通孔4Cを貫通した先端がほぼ円錐形状の係止部13, 17の先端をスペーサ本体2の貫通孔2Dに係止

して固定するようにしてもよい。図9及び図10で示した係止部13, 17を、その先端部ほど先細り形状となるほぼ円錐形状に形成することにより、貫通孔2Dへの貫通を容易に行うことができる利点があるが、前記と同様にほぼ円柱状のものや、三角柱や四角柱等の多角柱状のものでもよい。

【0021】又、前記実施例では、スペーサ本体2の上面に一対の固定部材7, 8を備えさせるために溝2Mを形成したが、図11(イ), (ロ)に示すように、スペーサ本体2に貫通孔2Eを形成し、この貫通孔2Eに固定部材7, 8を備えさせるようにしてもよい。このように貫通孔2Eを形成することによって、図5(イ)～(ニ)で示した4つの延出部2A…を不要にすることができる利点がある。又、図11(イ), (ロ)では、スペーサ本体2の側壁、つまり横側面2B, 2Cにスペーサ本体2の幅方向に沿う溝部2Nをそれぞれ形成して、これら溝部2N, 2Nを切断された椎弓4の上端角部4K, 4Kに係止することによって位置決めできるようにしてもよい。これら溝部2N, 2Nを、図5(イ)～(ニ)で示したスペーサ本体2に形成することによって、4つの延出部2A…のない溝2M付スペーサ本体2にすることができる。尚、図に示した他の構成が図8(イ), (ロ)のものと同一であるため、同一符号を付すと共に説明を省略する。

【0022】又、前記実施例では、歯部19と歯20との噛み合いを示したが、図12に示すように、一対の固定部材7, 8の一方8に長手方向に適当間隔置きに複数(図では5個であるがこの数以外であってもよい)の係止孔8A…を備えさせ、他方の固定部材7に前記複数の係止孔8A…のうちの特定の係止孔8Aに係止する係止ピン23を備えさせ、係止ピン23を特定の係止孔8Aに係止することによって、固定部材7, 8の固定が行えるように構成してもよく、固定部材7, 8の固定手段はこれらのものに限定されるものではない。尚、説明していない他の部分は、前述した構成と同様であるため、説明を省略するものとする。

【0023】又、前記実施例では、上下一対の部材9, 10を備えさせた固定部材7としたが、図13に示すように、左右一対の部材9, 10を備えさせた固定部材7としてもよい。この場合、他方の固定部材8の横一側面に、前記固定部材7の歯部19に噛み合う複数の歯20…を有する歯部21を形成することになる。尚、説明していない他の部分は、前述した構成と同様であるため、説明を省略するものとする。又、図8(イ)で示したように、固定部材7, 8をスペーサ本体2に備えさせることによって、スペーサ本体2を頸椎1に迅速に装着することができるのであるが、スペーサ本体2を頸椎1に介在させた後、固定部材7, 8を取り付けてスペーサ本体2を頸椎1に固定するようにしてもよい。

50 【0024】

【発明の効果】請求項1によれば、スペーサ本体に備えさせた一対の固定部材のそれぞれを、頸椎に形成した係止孔に固定部材の一端部を係止させることによって、スペーサ本体を頸椎間に固定することができ、しかも、係止後は移動阻止部によって離間する方向への固定部材の移動を阻止することができるから、従来のように糸を多数の孔に挿通させながらスペーサ本体を頸椎間に固定する場合に比べて、その作業を容易迅速に行うことができるだけでなく、糸が弛んでしまうようなことがなく、確実な固定が行え、その固定を長期間に渡って確実に維持させることができる。しかも、切断された頸椎間にスペーサ本体を介在した後は、頸椎間を拡大するようなことが不要であり、頸椎を傷めてしまうことがない。

【0025】請求項3によれば、被係止部が頸椎に形成した底部を有する鐘んだ凹部からなり、この凹部に係止部を突き刺すことにより凹部に係止部を係止させて、スペーサ本体の上方への移動を阻止することができる。しかも、被係止部を凹部にすることによって、被係止部の形成が貫通孔よりも凹部の方が容易に行うことができ、スペーサ本体を固定する作業時間の短縮化を図ることができるだけでなく、貫通孔を形成する時に他の部分をも傷めてしまうようなことがない。

【0026】請求項4によれば、被係止部が頸椎に形成した貫通孔からなり、この貫通孔に係止部を貫通させることにより貫通孔に係止部を係止させて、スペーサ本体の上方への移動を阻止することができる。しかも、被係止部を貫通孔にすることによって、請求項3のように凹部に突き刺す場合に比べて係止部と被係止部とが係止している領域を容易に増大させることができとなり、スペーサ本体の上方への移動をより確実に阻止することができる。又、前記凹部に係止部を突き刺す場合に、例えば凹部が脆くなっていると、凹部に係止部を良好に突き刺すことができず、係止が良好に行えないことになるが、このようなことがなく、確実に係止させることができる利点がある。

【0027】請求項5によれば、貫通孔から貫通突出した係止部の先端が係止可能な貫通孔又は凹部をスペーサ本体に形成することによって、係止部が係止している領域を更に増大させることができ、請求項4に比べてスペーサ本体の上方への移動を更に一層阻止することができる。

【0028】請求項6によれば、挿入片を挿持部にて挿み込む構成であるから、一方の部材の内面に形成された歯部が挿入片に備えさせた複数の歯のうちの特定の歯に噛み合うと、前記挿持部による挿入片の挿持を解除しない限り、前記噛み合いが解除されることはなく、スペーサ本体の固定が容易に解除されることがないように構成することができる。又、一方の部材に形成の歯部に噛み合う複数の歯を他方の部材に設けることによって、任意の歯に歯部を噛み合わせることができ、頸椎に形成した

係止孔が所望位置からずれている場合でも、これを吸収して係止後の一対の固定部材の離間側への移動を確実に阻止することができるから、係止孔の形成位置に精度を要することができなく、頸椎間にスペーサを装着させる作業時間の短縮化を図ることができる。しかも、一対の固定部材の離間側への移動を噛み合いによるもので阻止することによって、その阻止のための操作が不要であり、例えばねじにより固定するものに比べて操作性の向上を図ることができる。

10 【0029】請求項7によれば、切断箇所を頸椎の椎弓の特定箇所とし、この切断した椎弓の角部が係止可能な溝部をスペーサ本体の側壁に形成することによって、椎弓の角部にスペーサ本体の側壁を係止させるだけで、椎弓間に介在させたスペーサ本体が位置変更することを阻止することができ、スペーサ本体の固定を一層迅速に行うことができる。

#### 【図面の簡単な説明】

【図1】(イ)は頸椎の平面図、(ロ)は頸椎の棘突起間にスペーサ本体を装着した状態を示す一部切り欠き平面図

20 【図2】スペーサ本体及び固定部材の斜視図

【図3】一方の固定部材を示し、(イ)は平面図、(ロ)は背面図、(ハ)は側面図、(ニ)は正面図、(ホ)は底面図

【図4】他方の固定部材を示し、(イ)は平面図、(ロ)は正面図、(ハ)は側面図、(ニ)は背面図、(ホ)は底面図

【図5】スペーサ本体を示し、(イ)は平面図、(ロ)は側面図、(ハ)は底面図、(ニ)は正面図

30 【図6】(イ)はスペーサ本体を頸椎の棘突起間に装着する直前の状態を示す一部断面にした説明図、(ロ)はスペーサ本体を頸椎の棘突起間に装着した状態を示す縦断面図

【図7】(イ)は頸椎の平面図、(ロ)は頸椎の椎弓間にスペーサ本体を装着した状態を示す一部切り欠き平面図

【図8】(イ)は頸椎の椎弓間にスペーサ本体を装着する直前の状態を示す一部断面にした説明図、(ロ)はスペーサ本体を頸椎の椎弓間に装着した状態を示す縦断面図

40 【図9】図8で示した椎弓間にスペーサ本体の係止構造の別の構造を示し、(イ)は頸椎の椎弓間にスペーサ本体を装着する直前の状態を示す一部断面にした説明図、(ロ)はスペーサ本体を頸椎の椎弓間に装着した状態を示す縦断面図

【図10】図8で示した椎弓間にスペーサ本体の係止構造の別の構造を示し、(イ)は頸椎の椎弓間にスペーサ本体を装着する直前の状態を示す一部断面にした説明図、(ロ)はスペーサ本体を頸椎の椎弓間に装着した状態を示す縦断面図

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【図11】固定部材をスペーサ本体に備えさせるためのスペーサ本体の別の構造を示し、頸椎の椎弓間にスペーサ本体を装着する直前の状態を示す一部断面にした説明図、(口)はスペーサ本体を頸椎の椎弓間に装着した状態を示す縦断面図

【図12】別の形状の固定部材を示す斜視図

【図13】別の形状の固定部材を示す斜視図

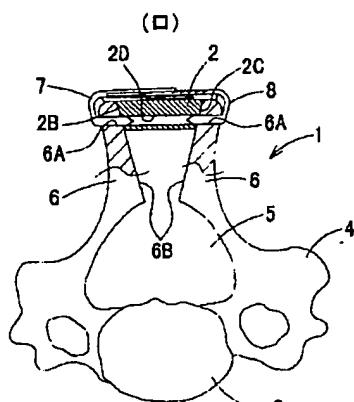
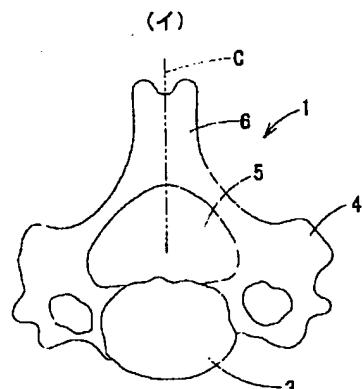
【図14】(イ)は頸椎の椎弓間にスペーサ本体を糸を用いて固定している途中の状態の従来例を示す説明図、(ロ)は頸椎の椎弓間にスペーサ本体を糸を用いて固定した状態の従来例を示す図

【符号の説明】

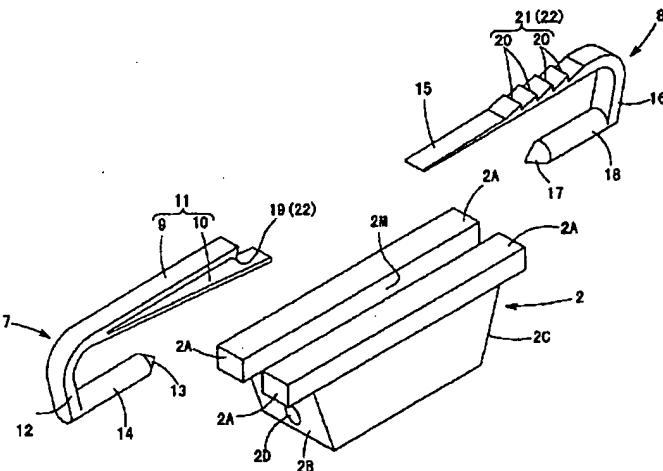
1 頸椎	2 スペーサ本体
2A 延出部	2B, 2C 横側面
2D 貫通孔 (係止孔)	2E 貫通孔
2M 溝	3 椎体
2N 溝部	4A 端面
4 椎弓	

4B 係止孔	4C 貫通孔
4K 上端角部	4b 壁面
5 椎孔	6 棘突起
6A 貫通孔	6B 端面
7, 8 固定部材	7A 係止孔
9, 10 部材	11 挾持部 (上側部)
部)	
12 縦部	13 係止部
14 水平部 (下側部)	15 挿入片 (上側部)
部)	
16 縦部	17 係止部
18 水平部 (下側部)	19 齒部
20 齒	21 齒部
22 移動阻止部	23 係止ピン
30A, 30B 貫通孔	31 糸
32 孔	33 横側壁
34 孔	C 切断位置

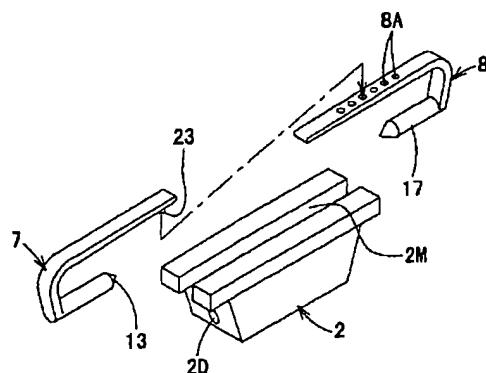
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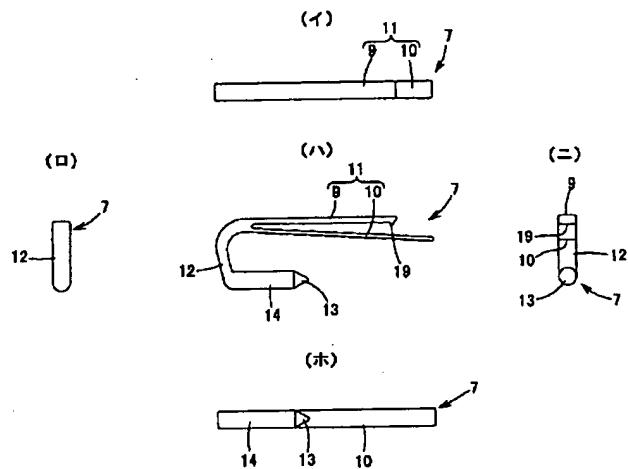
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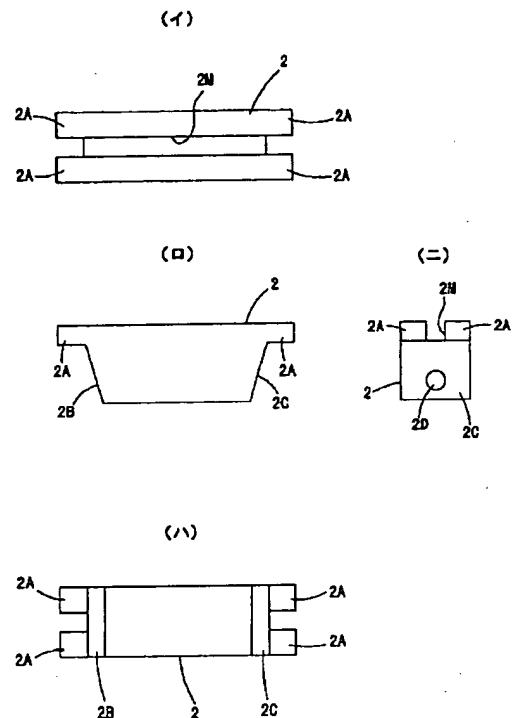
【図12】



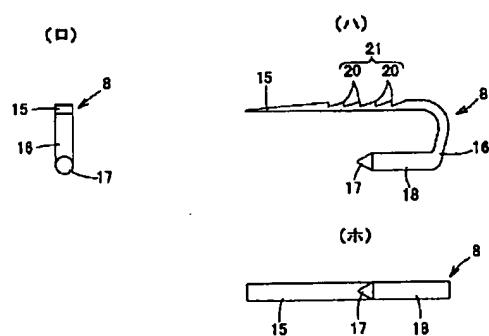
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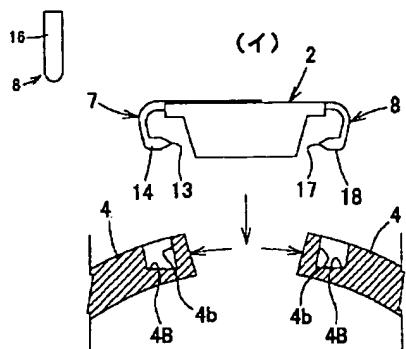
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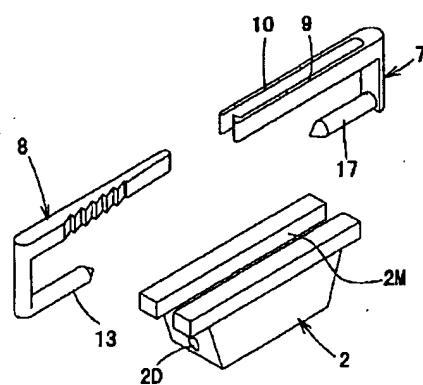
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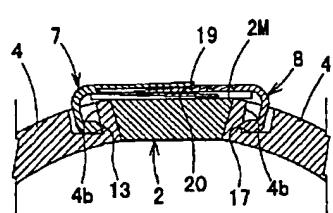
【図8】



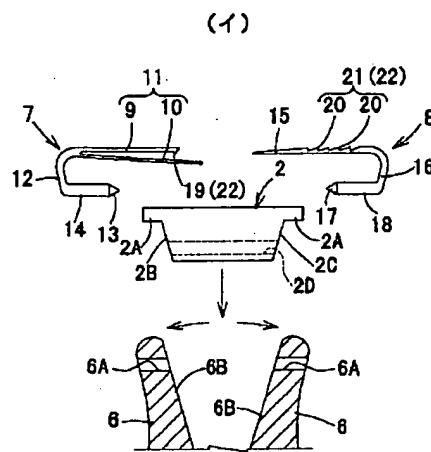
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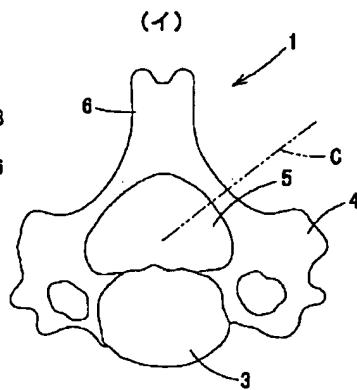
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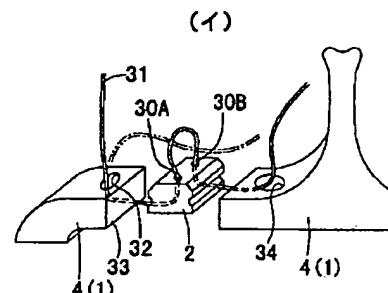
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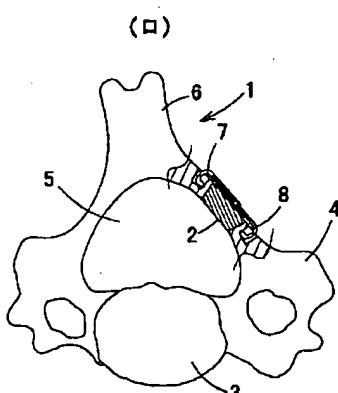
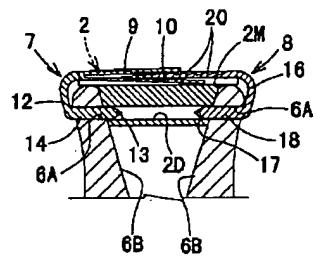
【図7】



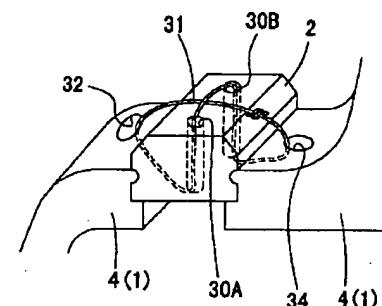
【図14】



(口)

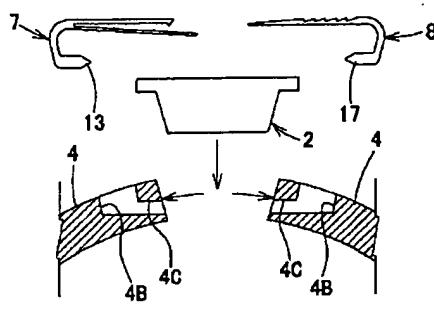


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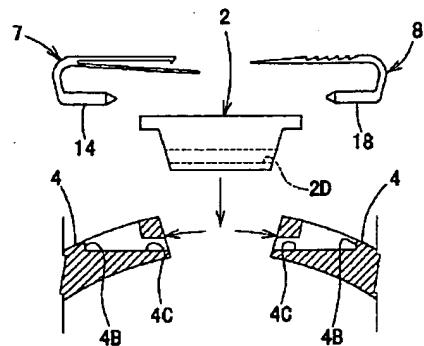
【図9】

(1)

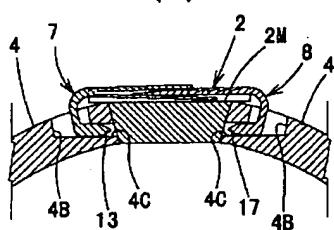


【図10】

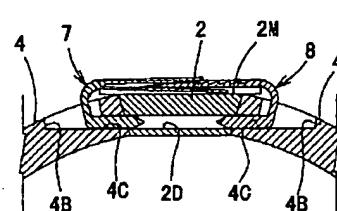
(1)



(口)

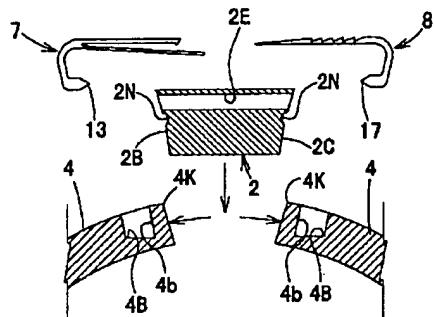


(口)

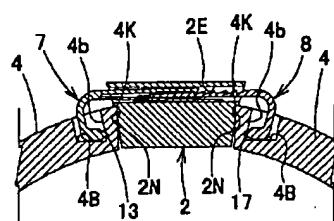


【図11】

(1)



(口)



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CF121 CF141 CF151 CG03

CG05 DA01

4C097 AA10 BB09 CC05 DD06

DD07 DD09 DD10 SC10

## (54) (Title of Invention) SPACER FOR CERVICAL VERTEBRAL EXPANSION

(57) (Abstract)

(Summary)

(Problem) To provide a spacer for cervical vertebral expansion capable of retaining a space between cervical vertebrae easily and quickly, avoiding unnecessary enlargement of a vertebral bisection, while reliably retaining the fixed space over a long period of time.

(Solving the Problem) A spacer (2) is interposed into a cervical vertebral (1) space made by a bisection at a predetermined site on the cervical vertebra; in order for said spacer (2) to retain the cervical vertebral space a pair of anchoring components (7) (8) are

installed therein, the spacer (2) interconnecting on either side with a component member, sections of which are oriented toward each other at either end of the cervical vertebral space; a lock (13) (17) is installed that fastens into a locking aperture (2D) formed into a prescribed shape within the cervical vertebra; and movement restrictors (22) are installed in order to prevent the anchoring components (7) (8) from moving in separate directions.

(a)

(b)

(Scope of Patent Claims)

(Claim 1) A spacer for cervical vertebral expansion characterized by installing a pair of anchoring components together with a spacer chassis that interconnects on either side with a component member, with sections of the anchoring components oriented toward each other at either end of the cervical vertebral space; equipped with a lock that fastens into a lock receiving part formed into a prescribed shape within the cervical vertebra; and installed with a movement restrictor in order to prevent the anchoring components from moving in separate directions on either end, wherein said expansion comprises a spacer chassis for the purpose of being interposed into a cervical vertebral space made by bisecting predetermined site on the cervical vertebra, and a pair of anchoring components to enable the spacer chassis to retain the cervical vertebral space.

(Claim 2) The spacer for cervical vertebral expansion as recited in claim 1, characterized by the construction of a nearly "□" shaped component when viewed from the side; equipped with a movement restrictor on the flexible end of the upper section and equipped with a lock on the flexible end of the lower section; the pair of anchoring components positioned so that the upper section and lower sections of the respective flexible component members face each other; and the upper section component member of the pair of anchoring components is installed to interconnect with the spacer chassis, wherein said construction comprises an upper section and a lower section on each anchoring component, the lower section positioned on the lower side of the upper section, the ends of these upper sections and the ends of the lower sections on the same side being connected by risers.

(Claim 3) The spacer for cervical vertebral expansion as recited in claim 1, characterized by a lock for fastening into a concave area by means of thrusting the lock into the concave area, wherein said thrusting means comprises a lock receiving part, the bottom section being an excavated concave area formed into a prescribed shape within the cervical vertebra.

(Claim 4) The spacer for cervical vertebral expansion as recited in claim 1, characterized by a lock for fastening into a tunnel by means of the lock passing completely through the tunnel, wherein said tunnel comprises a lock receiving part formed in a prescribed shape within the cervical vertebra.

(Claim 5) The spacer for cervical vertebral expansion as recited in claims 1 and 4, comprises a spiked end of the lock that passes through and exits the tunnel forming the concave area and tunnel on the spacer chassis.

(Claim 6) The spacer for cervical vertebral expansion as recited in claims 1 and 2, enabled by the formation of a movement restrictor made with a series of serrated teeth installed on the insertion side in order to block any sliding motion in separate directions by the anchoring components; the teeth being formed in a prescribed shape on the side of the component forming the clip; comprised of an insertion side capable of penetrating into the space between the pair of components from the area of the opening edge on one side of the clip; and capable of penetrating the interior of the tunnel and locking aperture; having been formed into a prescribed shape following the direction of the cervical vertebral gap into the spacer chassis wherein the upper section of one of the anchoring components is able to penetrate through the interior of the channel and into the upper side of the opposite anchoring component; made from a bifurcated clip comprised of one opened component on the side occupied by the flexible end with the ability to penetrate into the interior of the tunnel and locking aperture, they having been formed following the direction of the gap in the cervical vertebra into the spacer chassis in the upper section of one side of an anchoring component.

(Claim 7) The spacer for cervical vertebral expansion as recited in claim 1, enabled by the formation along a wall of the spacer chassis of a channel compartment, capable of being locked, on the corner of the bisected vertebral arch; the cervical vertebral arch having been bisected at a predetermined site.

(Claim 8) The spacer for cervical vertebral expansion as recited in claim 1, enabled by the arrangement of the spacer chassis in the gap between the nearly evenly divided cervical vertebral protuberances, having been separated into two nearly equal parts at the bisection site.

#### (Detailed Explanation of the Invention)

##### (0001)

(Technological Field of Invention) The present invention concerns a spacer for cervical vertebral expansion in order to remove the source of an impairment causing pressure on the spinal cord, enlarging the cervical vertebra by means of arranging a spacer chassis into the space created by the bisection of a cervical vertebra at a predetermined site.

##### (0002)

(Conventional Technology) In conventional technology, as shown in figure 14 for example, a cervical vertebra (1) was bisected at a predetermined site on the vertebral arch (4), a spacer (2) manufactured with two vertical apertures (30A) (30B) was interposed in the gap of the severed cervical arch (4)(4) and the gap in the cervical arch (4) (4) was fixed by the interposed spacer (2) using thread (31). In other words, after the thread (31) is inserted vertically it passes through the aperture (32), having been created for that reason, through the interior edge of one side of the vertebral arch. Next, after ascending

and then descending through the locking aperture (30A) on one side of the spacer chassis (2), and ascending and descending through the locking aperture (30B) on the other side of the spacer chassis (2), and after traveling through the respective walls of the opposite side of the severed cervical arch (4) and threading the outer aperture (34) on the upper side, finally, the thread (31) point ends in the area where it began, thus spanning the gap in the vertebral arch (4) (4) with a spacer chassis (2).

(0003) In the previous method, because the thread (31) is forced to wind through numerous apertures (31) (30A) (30B) (34), a significant amount of time spent laboring this way is required, giving the patient an onerous burden to carry. Furthermore, in the situation where additional stress is added to the tension of the thread (31) not only is it finished rigidly, over the course of time the thread (31) tends to slacken, not allowing the gap in the cervical arch (4) (4) to be retained by a spacer chassis (2) with any degree of certainty. And, in order for the thread (31) to travel through the contents in the gap between the cervical arch (4) and the spacer chassis (2), as shown in figure 14 (a), there must be a certain amount of space left between the spacer chassis (2) and the gap in the cervical arch (4). In doing this, in order to interpose the spacer chassis (2) into the same site as the severed vertebral arch (4) the least amount of space required must be opened, engineering either a larger or smaller than necessary size can risk injuring the vertebral arch.

(0004)

(Invention's Solution to the Problem) The present invention can heed the lesson learned from the previously related circumstances in the attempt to solve the problem, that is, to be able to retain the contents in the cervical vertebral gap with the spacer chassis quickly, at the same time the retention must be reliable enough to maintain the space over a long period of time and being able to avoid enlarging the bisection of the cervical vertebra unnecessarily, all of which are offered by the spacer for cervical vertebral expansion.

(0005)

(Means of Solving the Problems) For the problem to be solved, the present invention is characterized by installing a pair of anchoring components together with a spacer chassis that interconnects on either side with a component member, with sections of the anchoring components oriented toward each other at either end of the cervical vertebral space; equipped with a lock that fastens into a lock receiving part formed into a prescribed shape within the cervical vertebra; and installed with a movement restrictor in order to prevent the anchoring components from moving in separate directions on either end; comprised a spacer chassis for the purpose of being interposed into a cervical vertebral space made by bisecting predetermined site on the cervical vertebra, and a pair of anchoring components to enable the spacer chassis to retain the cervical vertebral space.

(0006)

(Claim 2) The spacer for cervical vertebral expansion characterized by the construction of a nearly "□" shaped component when viewed from the side; equipped with a movement restrictor on the flexible end of the upper section and equipped with a

lock on the flexible end of the lower section; the pair of anchoring components positioned so that the upper section and lower sections of the respective flexible component members face each other; and the upper section component member of the pair of anchoring components is installed to interconnect with the spacer chassis, wherein said construction comprises an upper section and a lower section on each anchoring component, the lower section positioned on the lower side of the upper section, the ends of these upper sections and the ends of the lower sections on the same side being connected by risers.

(0007)

In order to prevent vertical movement of the spacer chassis a lock for fastening into a concave area by means of thrusting the lock into the concave area is installed; comprised of a lock receiving part, the bottom section being an excavated concave area formed into a prescribed shape within the cervical vertebra. Furthermore, by means of the lock receiving part functioning within the concave area, the shape of the lock receiving part comes from the conduct of the contents within the concave area.

(0008)

In order to prevent vertical movement of the spacer chassis, a lock for fastening into a tunnel by means of the lock passing completely through the tunnel is provided and comprised of a lock receiving part formed in a prescribed shape within the cervical vertebra. Furthermore, with the lock receiving part functioning within the tunnel, the contents within the sphere of locking between the lock and the lock receiving part increase

(0009)

A movement restrictor is made with a series of serrated teeth installed on the insertion side in order to block any sliding motion in separate directions by the anchoring components; the teeth being formed in a prescribed shape on the side of the component forming the clip; comprised of an insertion side capable of penetrating into the space between the pair of components from the area of the opening edge on one side of the clip; and capable of penetrating the interior of the tunnel and locking aperture; having been formed into a prescribed shape following the direction of the cervical vertebral gap into the spacer chassis wherein the upper section of one of the anchoring components is able to penetrate through the interior of the channel and into the upper side of the opposite anchoring component; made from a bifurcated clip comprised of one opened component on the side occupied by the flexible end with the ability to penetrate into the interior of the spacer chassis; the spiked end of the lock passes through and exits the tunnel. one side of the component installed into the clip and the movement restrictor, even in the case where the locking aperture formed on the cervical vertebra slips from the desired position, the action is absorbed after the lock is absorbed it is capable or reliably preventing any movement on the part of the separate sides of the pair of anchoring components.

(0011) (translator's note: item 0010 is missing from text) After the selection of a site for bisection on the vertebral arch of the cervical vertebra, by means of forming a locking-capable channel onto the wall of the spacer chassis, that wall is stopped only by the corner of the bisected vertebral arch; the spacer chassis interposed into the space of the vertebral arch capable of preventing any change in position.

(0012) Equally divided protuberances of the cervical vertebra establish a better position for the spacer chassis.

(0013)

(Configuration of the Working Invention) Figure 1 (a) shows the first individual cervical vertebra (1) drawing among seven; at a predetermined site of this cervical vertebra (1) a protuberance (6) is drawn into 2 equal parts; then, bisected at a position dividing them into 2 nearly equal parts; as shown in figure 1 (b), a spacer chassis (2) interposes and retains the space between the bisected protuberances (6) (6). The cervical vertebra (1), is comprised of the stump of the vertebral trunk (3) and all that is behind it, a vertebral arch (4) and all others associated with it. The space between the vertebral trunk and the vertebral arch is a hole called the vertebral fossa wherein the spinal cord is held. The protuberance (6) on the main body emerges laterally posterior to the vertebral arch (4).

(0014) In figure 1 (b), are a pair of anchoring components (7) (8) equipped with a synchronous, vertically directed, free moving slide interconnected to the spacer chassis (2) interposed in the interprotuberant space; in this way the spacer chassis (2) is able to retain the inter protuberant space (6)(6). With horizontal rods (14) (18), retaining and locking onto the spacer chassis, the locking apertures (6A) (6A) are formed in the nearly equally divided, thin protuberances (6) (6); in this way, it is possible to control the level of maintenance to a minimum level and to lock and retain the space with a degree of certainty.

(0015) Characteristic of the in vivo stability of the spacer chassis (2) is its biocompatibility, corrosion resistance and the strength of its machinery; included among the ceramic materials with which it is prepared are alumina, siliconia, and hydroxyapatite; stainless steel and titanium alloys are metallic materials that correspond to the surface requirement; also allowable for composition are alumina, apatite, and nitriding titanium, compound materials used for ceramic coatings; and even a composition of harvested natural bone is acceptable. As shown in figures 2 and 5 (a), (b), (c), and (d), the spacer chassis (2) makes contact at the superior end on both sides running lengthwise, with the upper surface of the protuberances (6) and, together with the installation of the extender (2A), the profile is able to be maintained; a channel (2M) is installed within the upper surface of the spacer chassis, running length wise, the width of the chassis to the right and left of it nearly equal, positioning the channel centrally. When connected, the lower sides (2B) (2C) of the spacer chassis (2) corresponding to the upper section (6B) (6B) of the bisected protuberance (6) incline to the point where they face to the interior of the chassis; Figure 1 (b) shows the terminal sections (6A) (6A) of the protuberance (6) at the time the protuberance (6) was bisected, illustrating the way in

which the ends of the protuberance (6) were tapered by means of planning; the respective sides (2B) (2C) of the spacer chassis (2) are capable of making contact with the entire surface of the ends (6B) (6B) of the bisected protuberance (6); in this way stabilization of the position of the spacer chassis (2) interposed into the interprotuberant space (6) (6) is increased. Furthermore, a connection less broad than that shown in the figure between the spacer chassis (2) and the protuberance (6) is acceptable.

(0016) The pair of anchoring components (7) (8) is composed of stainless steel but can be composed of any of the titanium alloys from among the various metallic materials or from a metallic resin. As shown in figures 2 and 3 (a), (b), (c), (d), and (e), on one side (7) of the pair of anchoring components (7) (8), capable of penetrating through the interior of the tunnel (2M) is a bifurcated clip (upper side) (11) comprised of upper and lower anchoring components (9) (10) that are open on the penetrating, flexible end; the clip (11) exits the spacer chassis (2) through an external opening; a riser (12) extends curving as it descends; from the lower end of the riser (12) it extends toward the side of the spacer chassis (2); and is made of a horizontal rod equipped with a cone shaped lock on the bottom extension and upper ends of two different lengths; the lock (13), after passing through the locking aperture (6A) and through the lock receiver formed on one side of the bisected protuberance (6) connects into the locking aperture (2D) formed in the spacer chassis (2). And, as shown in figure 2 and 4 (a), (b), (c), (d), and (e), is able to pass into the interior of the channel (2M) into the spacer chassis, with the other area shown as 8; and, the penetrated flexible end, from the opened end of the clip (11) with the insertion side (upper section) (15) is capable of passing into the space between the upper and lower components (9) (10); and a riser (16) that extends downward from the end of the insertion side (15); from its lower point this riser (16) extends into the side of the spacer chassis (2); and, at the end of the rod is a cone-shaped lock (17); the installed the clip (11) is made of a horizontal rod (lower section) (18) made with two differing lengths. The lock (17) connects into a locking aperture (2D) formed within the spacer chassis (2), after traveling through a tunnel (6A) formed in the other side of the protuberance (6). By shaping the end of the locks (13) (17) in a tapering fashion to the extent that the end point becomes cone-shaped is an advantage in penetrating through the contents in the tunnel (2D); among the considered shape types of three- and four-cornered rods, the cone shape was the most beneficial.

(0017) Then, teeth (19) are formed on the lower section of the flexible end on the upper side of the component (7) (8); these teeth (19), having a serrated appearance (21), applied to the upper section of the insertion side (15) in multiple numbers in order to block any sliding motion in separate directions by the anchoring components (7) (8); capable of grasping opposing teeth (20) block any sliding motion in separate directions by the anchoring components; the teeth being formed in a prescribed shape on the movement restrictor (22) to obstruct the sliding motion in separate directions.

(0018) As shown in figure 6 (a), first, a protuberance (6) (6) is bisected, the space becomes occupied by a tunnel (2D) on the spacer chassis (2) having been bored completely through; tunnels (6A) (6A) are formed in the same configuration as that of tunnel (2D); following that, the protuberance (6) (6) are separated and central to the

resulting space (6)(6) locking apertures are inserted in order to provide a foundation for the spacer chassis (2). Next, a pair of anchoring components (7) (8); both sides of the protuberance (6) (6); horizontal rods (14) (18) of the anchoring components (7) (8); locking apertures (6A) (6A) fastened within the protuberance (6) (6); and from a clip (11) on the insertion side (15) with capacity to penetrate, (11) (15) occupy the interior of a channel (2M); with sliding motion, the anchoring components (7) (8) are able to slide into place; and the risers (12) (16) of the anchoring components (7) (8) come into contact with the interior sides of the protuberance (6)(6); from there the anchoring components (7) (8) are able to slide into place. (Reference figure 6b). In order, the anchoring components (7) (8) and the spacer chassis (2) are positioned properly; a spacer chassis (2) having been equipped with anchoring components (7) (8) is interposed into the space of a bisected protuberance (6) (6); the anchoring components (7) (8) operate by means of a sliding motion. In this case, before interposing the spacer chassis (2), the anchoring components (7) (8) are separated in an exaggerated manner from the corresponding spacer chassis (2); the horizontal rods (14) (18) of the anchoring components (7) (8) prior to the spacer chassis (2) being interposed into the protuberance space (6) (6) forming the tunnels (6A) (6A) capable of allowing the respective spacer chassis (2) and anchoring components (7) (8) posed near the positions in which the action would take place. In this way, by means of the action after the spacer chassis (2) is interposed and the anchoring components (7) (8) are set in place, the locks (13) (17) of the horizontal rods (14) (18) on the spacer chassis (2) take effect by locking inside tunnel (2D) movement on top of the spacer chassis (2) is obstructed. Then, as shown in figure 6 (b), by means of the grip specific teeth (20) have on other teeth (19), the anchoring components (7) (8) separately slide together face each other thereby obstructing movement of the spacer chassis (2) within the space of the protuberance (6) (6). At this time, the pair of anchoring components (9) (10) penetrate the insertion side (15) (by using the clip), and by specific teeth (20) grasping other teeth (19), the obstruction of movement can be made certain.

(0019) As a working example, at a bisection site on a cervical vertebra (1) a protuberance (6) is divided into 2 parts, the nearly identical parts are positioned so as to enable the interposition of the spacer chassis (2) into the space between the bisected protuberances (6) (6), as shown in figure 7 (a) and (b), the bisection site (C) on the cervical vertebra (1) was a predetermined location on the vertebral arch (4), in the space of the bisected cervical arch (4) (4), a spacer chassis (2) is inserted; and, as shown in figure 8 (a), first, the cervical arch (4) (4) is cut and the parts widened in order to accommodate the anchoring components (7) (8) installed with the insertion of the spacer chassis (2). In this case, prior to the interposition of the spacer chassis (2), the anchoring components (7) (8) corresponding to the spacer chassis (2) are separated from their normal position in an exaggerated manner with the horizontal rods (14) (18) of the anchoring components (7) (8); locking apertures (4B) (4B) capable of being penetrated by the anchoring components (7) (8) of the spacer chassis (2) positioned on either side prior to their use. In this way the spacer chassis (2) is inserted, and by means of the movement of the anchoring components (7) (8) positioned on either side; the cone-shaped locks (13) (17) on the horizontal rods (14) (18); the locking apertures (4B) (4B) facilitated within the wall sections (4b) (4b), (reference figure 8b), wherein the upper section of the spacer chassis (2) is made immobile. Now, as shown in figure 8 (a), by means of specific teeth (20)

grasping onto other teeth (19), the anchoring components (7) (8) through a sliding motion facing each other can obstruct movement in separate directions and the spacer chassis (2) is able to retain the space in the cervical arch (4) (4). Also, in this case are a pair of anchoring components (9) (10) penetrating the insertion side (15) (using a clip); specific teeth (20) which grasp onto other teeth (19) in order to obstruct movement with a degree of certainty. The fashioning of locks (13) (17) and the tapering of the ends rendering a sharp point on the cone-shaped lock, whereby the capability of the locking aperture (4B) (4B) is facilitated within the wall sections (4b) (4b), in no way the formation of the cone-shaped end a limiting factor.

(0020) The preferred locking assembly of the anchoring components (7) (8) is shown in figure 9 (a) and (b); along the respective directions of the locking apertures (4B) (4B), the tunnels (4C) are excavated, at the end of this tunnel (4C) are cone-shaped locks (13) (17) having the preferred type of end point with which to fasten and retain; and, as shown in figure 10 (a) and (b), the horizontal rods (14) (18) are fashioned long; the ends of locks (13) (17) on the spacer chassis (2) are formed to fasten within the locking aperture (2D); the end points excavating the tunnel (4C) are sharp, cone-shaped locks (13) (17) which are preferred in fastening the spacer chassis (2) within a tunnel (2D). As shown in figures 9 and 10, by forming a cone-shape on the tapered ends of locks (13) (17) the journey through the contents of the tunnel (2D) is facilitated; the cone-shaped lock is preferred to all other shapes including the three- and four-cornered posts.

(0021) As a working example, the upper section of the spacer chassis (2) is installed with a pair of anchoring components (7) (8) in order to form the channel (2M), as shown in figure 11 (a) and (b) wherein a tunnel (2E) is formed with a spacer chassis (2) installed within the tunnel (2E) are the preferred anchoring components (7) (8). By means of the formation of a tunnel (2E) in this way, as shown in figures 5 (a), (b), (c), and (d), the four extenders (2A) are not necessary. And, in figure 11 (a) and (b), each channel compartment (2N) is formed directly facing the respective sides (2B) (2C) and walls of the spacer chassis (2); this particular means of fastening these channel compartments (2N) (2N) in the upper corner (4K) (4K) of the bisected vertebral arch (4) is preferred. By forming these channel compartments (2N) (2N) in the spacer chassis (2) as shown in figure 5 (a), (b), (c), and (d), the absence of the 4 extenders (2A) in the channel (2M) of the spacer chassis (2) is possible. For the sake of abbreviation, similar explanations to the examples are given in figure 8 (a) and (b).

(0022) Again, as a working example, the grasping of the teeth (19) by the teeth (20) is represented in figure 12, wherein on one side (8) of a pair of anchoring components (7) (8), running lengthwise, a number of locking apertures (8A) are installed appropriately spaced, (a number different from the five shown in the figure may be preferred); on the other side of the anchoring component (7) an equally appropriate number of locking pins (23) are installed corresponding specifically to the locking apertures (8A); by means of fastening a specific locking pin (23) into a specific locking aperture (8A) the performance of retention by the anchoring components (7) (8) is enhanced and the means of retention is not limited. A brief explanation will follow.

(0023) As a working example, the upper and lower pair of components (9) (10) are installed on an anchoring component (7); as shown in figure 13, the right and left pair of the components (9) (10) are installed on the preferred anchoring component (7). In this case, on the respective side of the anchoring component (8) a specific number of teeth (formed as needed) (20) grasp the teeth (19) on the anchoring component (7); as an explanation of this has not been given in another section a brief explanation will be offered here. Again, as shown in figure 8 (a), anchoring components (7) (8) are installed in a spacer chassis (2); a spacer chassis (2) easily and quickly installed into a cervical vertebra (1); after the spacer chassis (2) has been interposed into the cervical vertebra (1) anchoring components (7) (8) are attached to the spacer chassis (2) thereby retaining the cervical vertebra (1).

(0024)

(Effect of the Invention) According to claim 1, a spacer chassis installed with a pair of anchoring components, each of which interconnects on either side of the spacer chassis for the purpose of retaining the cervical vertebral space. In addition, after securing the movement restrictor, it is possible to obstruct movement of the anchoring components in separate directions; in comparing the conventional method of threading multiple strands of thread through apertures with the spacer that retains a cervical vertebral space, not only can the work be completed quickly and easily, the use of thread is not required, the retention is held with certainty, the retention is capable of lasting reliably over a long period of time. Furthermore, after interposing a spacer chassis into a bisected cervical intervertebral space, unnecessarily enlarging the space is not a concern.

(0025) According to claim 3, characterized by a lock for fastening into a concave area by means of thrusting the lock into the concave area, wherein said thrusting means comprises a lock receiving part, the bottom section being an excavated concave area formed into a prescribed shape within the cervical vertebra.; a spacer chassis capable of obstructing movement in a vertical direction. In addition, it is possible to perform the function of connection through the contents by means of a lock receiving part in a concave area, and, not only does the amount of work to install the spacer chassis for retention require a small amount of time, additional time is saved in the formation of the tunnel which is advantageous.

(0026) According to claim 4, a lock for fastening into a tunnel by means of the lock passing completely through the tunnel, wherein said tunnel comprises a lock receiving part formed in a prescribed shape within the cervical vertebra; providing a spacer chassis capable of obstructing movement in a vertical direction. In addition, considering the means of tunneling to make a lock receiving area, more contents are created by the process of the excavation and comparing the claim of preparing a concave area quickly and easily, the spacer chassis is capable of obstructing movement in a vertical direction with certainty. Again, for the case to easily and quickly lock in a concave area, for example, a concave area can easily be broken and a locking concave area is not easily and quickly formed, not only should the task be performed with ease, it should be performed with certainty.

(0027) According to claim 5, with a spiked end of the lock that passes through and exits the tunnel forming the concave area and tunnel on the spacer chassis; the possibility of fastening the lock greatly increases and with claim 4, the ease with which it is accomplished increases.

(0028) According to claim 6, By means of entering into the space between the pair of components and the clip on the insertion side, the insertion side of the individual component member is penetrated by the clip; this condition, when specific teeth among the many installed on the clip come into direct contact the teeth manufactured on one side of the internal surface of the component member, to the extent that the grasp of the clip is not released, the grip will not be broken. Furthermore, with teeth formed on one side of the component installed into the clip and the movement restrictor, by means of the use of these series of serrated teeth installed on the insertion side in order coming into direct contact with the teeth formed on the creation of an insertion side capable of penetrating into the space between the pair of components; the spacer chassis is capable of obstructing movement without release.

(0029) According the claim 7, the formation along a wall of the spacer chassis of a channel compartment, capable of being locked, on the corner of the bisected vertebral arch; the cervical vertebral arch having been bisected at a predetermined site. In this way the upper corner of the vertebral arch is locked into one wall of the spacer chassis; once introduced into the vertebral arch space, the spacer chassis will obstruct movement without moving itself; a spacer that retains the space reliably and quickly.

#### (Brief Description of the Drawings)

Figure 1 (a) is a plan drawing of a cervical vertebra, (b) is a plan drawing of a partial section showing the condition where the spacer chassis is installed in the space between the spinal protuberances of the cervical vertebra.

Figure 2 is an angled view of the spacer chassis and the anchoring components

Figure 3 shows the disposition of the anchoring component, (a) at level view, (b) from an elevated view, (c) in a side view, (d) in a frontal view, and (e) in a view from below

Figure 4 shows other aspects of the anchoring component, (a) at level view, (b) in a frontal view, (c) in a side view, (d) in an elevated view, and (e) in a view from below

Figure 5 shows the spacer chassis, (a) at level view, (b) in a side view, (c) in a view from below, and (d) in an elevated view

Figure 6 (a) is a drawing of a partial section that shows the condition prior to the insertion of the spacer chassis into the space between the spinal protuberances of the cervical

vertebra, (b) is a drawing of a linear section showing the condition of the spacer chassis inserted into the space between the spinal protuberances of the cervical vertebra

Figure 7(a) is a plan drawing of a cervical vertebra, (b) is a plan drawing of a partial section that shows the condition prior to the insertion of the spacer chassis into the gap on the cervical vertebral arch

Figure 8 (a) is a drawing of a partial section that shows the condition prior to the insertion of the spacer chassis into the gap on the cervical vertebral arch, (b) is a drawing of a linear section showing the condition after insertion of the spacer chassis into the gap on the cervical vertebral arch

Figure 9 shows the structure of the locking assembly separate from the spacer chassis, which is also separate from the gap on the vertebral arch as shown in fig. 8, (a) is a drawing of a partial section that shows the condition prior to the insertion of the spacer chassis into the gap on the cervical vertebral arch, (b) is a drawing of a linear section showing the condition after insertion of the spacer chassis into the gap on the cervical vertebral arch

Figure 10 shows the structure of the locking assembly separate from the spacer chassis, which is also separate from the gap on the vertebral arch as shown in fig. 8, (a) is a drawing of a partial section that shows the condition prior to the insertion of the spacer chassis into the gap on the cervical vertebral arch, (b) is a drawing of a linear section showing the condition after insertion of the spacer chassis into the gap on the cervical vertebral arch

Figure 11 shows the structure of the spacer chassis separated from the anchoring components with which it is equipped, (a) is a descriptive drawing of the partial section that shows the condition prior to insertion of the spacer chassis into the gap on the cervical vertebral arch, (b) is a drawing of a linear section showing the condition after insertion of the spacer chassis into the gap on the cervical vertebral arch

Figure 12 is an angled view showing the shape of the anchoring components when disassembled

Figure 13 is an angled view showing the shape of the anchoring components when disassembled

Figure 14 (a) is a drawing that shows a conventional example of anchoring the spacer chassis midway into the space of the cervical vertebral arch using thread, (b) is a drawing that shows a conventional example of the spacer chassis anchored into the space of the cervical vertebral arch using thread

(Explanation of Numbered Symbols)

1 Cervical vertebra

2 Spacer chassis

2A	Extender	2B, 2C	Respective sides
2D	Tunnel (Locking aperture)	2E	Tunnel
2M	Channel		
2N	Channel compartment	3	Vertebral trunk
4	Vertebral arch	4A	Outer edge
4B	Locking aperture	4C	Tunnel
4K	Upper corner	4b	Wall
5	Vertebral fossa	6	Protuberance
6A	Tunnel	6B	Outer edge
7, 8	Anchoring components	7A	Locking aperture
9, 10	Component	11	Clip (top)
12	Riser	13	Lock
14	Horizontal rod (bottom)	15	Insertion side (top)
16	Riser	17	Lock
18	Horizontal rod (bottom)	19	Teeth
20	Tooth	21	Teeth
22	Movement restrictor	23	Locking pin
30A, 30B	Tunnel	31	Thread
32	Aperture	33	Respective wall
34	Aperture	C	Bisection site

(page 7)

(Figure 1)  
(a)

(Figure 2)

(b)

(Figure 12)

(page 8)

(Figure 3)  
(a)  
(b) (c) (d)  
(e)(Figure 5)  
(a)  
(b) (c)(Figure 4)  
(a)  
(b) (c) (d)(d)  
(Figure 8)  
(a)

(e)

(Figure 13)

(b)

(page 9)

(Figure 6)  
(a)

(b)

(Figure 7)  
(a)

(b)

(Figure 14)  
(a)

(b)

(page 10)

(Figure 9)  
(a)  
(b)

(c)  
(d)

(Figure 10)  
(a)  
(b)